CLAIMS

What is claimed is:

1. A catalytic converter comprising:

a catalyst substrate comprising a catalyst;

a shell having an opening, and said shell concentrically disposed around said catalyst substrate;

a mat support material disposed between said catalyst substrate and said shell, and concentrically around said catalyst substrate;

a variable flow regulator concentrically disposed within said shell;

said end cone assembly attached to said variable flow regulator assembly; and

said variable flow regulator assembly comprises a first exhaust pipe, a second exhaust pipe concentrically disposed within said first exhaust pipe, and a movable exhaust pipe concentrically disposed between said first exhaust pipe and said second exhaust pipe.

2. The catalytic converter recited in Claim 1, further comprising said first exhaust pipe one or more interference tabs fitted concentrically and circumferentially about an interior surface of said first exhaust pipe.

3. The catalytic converter recited in Claim 2, further comprising said movable exhaust pipe includes one or more interference tabs fitted concentrically and circumferentially about an exterior surface of said movable exhaust pipe.

4. The catalytic converter recited in Claim 3, further comprising said interference tabs of said movable exhaust pipe and said interference tabs of said first exhaust pipe are configured to interact and restrict the movement of said variable flow regulator.

5. The catalytic converter recited in Claim 1, further comprising said movable exhaust pipe is configured to move in a linear direction along said second exhaust pipe, and between said first exhaust pipe and said second exhaust pipe, from a first position to a second position, and to a third position or to said first position, and from said third position to said first position.

6. The catalytic converter recited in Claim 1, further comprising said movable exhaust pipe is configured to rotate in a clockwise direction and a counterclockwise direction about said second exhaust pipe, and between said first exhaust pipe and said second exhaust pipe, from a first position to a second position, and to a third position or to said first position, and from said third position to said first position.

7. The catalytic converter recited in Claim 6, wherein said movable exhaust pipe further comprises a plurality of slots concentrically and circumferentially disposed about an outlet of said movable exhaust pipe, and said second exhaust pipe further comprises a plurality of slots concentrically and circumferentially disposed about an outlet of said second exhaust pipe.

8. The catalytic converter recited in Claim 1, wherein said shell further comprises a first end, a second end, and a containment area having a cylindrically shaped portion approximate to said first end.

9. A method for manufacturing a catalytic converter, comprising:

forming a catalyst substrate comprising a catalyst;

disposing said catalyst substrate concentrically within a shell having an opening;

disposing concentrically a mat support material in between said catalyst substrate and said shell, and around said catalyst substrate;

disposing concentrically a variable flow regulator within said shell, wherein said variable flow regulator assembly comprises a first exhaust pipe, a second exhaust pipe concentrically disposed within said first exhaust pipe, and a movable exhaust pipe concentrically disposed between said first exhaust pipe and said second exhaust pipe.

10. The method recited in claim 9, further comprising attaching said variable flow regulator to an endcone.

11. The method recited in claim 9, further comprising attaching said endcone to an exhaust system component selected from the group consisting of an exhaust pipe, a coupling apparatus, a connecting pipe, an exhaust manifold assembly, and combinations comprising at least one of the foregoing.

12. A method for achieving light-off in a catalytic converter, comprising:

activating the catalytic converter under cold start conditions;

introducing the exhaust gas into the catalytic converter through a variable flow regulator attached thereto, wherein said variable flow regulator comprises a first exhaust pipe having at least one interference tab concentrically and circumferentially disposed on an interior of said first exhaust pipe, a second exhaust pipe concentrically disposed within said first exhaust pipe, and a movable exhaust pipe having at least one interference tab disposed concentrically and circumferentially on an exterior of said movable exhaust pipe, and disposed concentrically between said first exhaust pipe and said second exhaust pipe;

controlling a flow maldistribution using said variable flow regulator; and

achieving light-off of the catalytic converter.

13. The method recited in Claim 12, wherein said controlling said flow maldistribution further comprises increasing said flow maldistribution using said variable flow regulator.

14. The method recited in Claim 13, wherein said increasing said flow maldistribution further comprises configuring said variable flow regulator to a first position.

15. The method recited in Claim 12, wherein said controlling said flow maldistribution further comprises decreasing said flow maldistribution using said variable flow regulator.

16. The method recited in claim 15, wherein said decreasing said flow maldistribution further comprises rotating said movable exhaust pipe about said second exhaust pipe from a first position to a second position.

17. The method recited in claim 16, further comprising substantially aligning a plurality of slots concentrically and circumferentially disposed about an outlet of said movable exhaust pipe with a plurality of slots concentrically and circumferentially disposed about an outlet of said second exhaust pipe.

18. The method recited in Claim 15, wherein said decreasing said flow maldistribution further comprises rotating said movable exhaust pipe about said second exhaust pipe from a second position to a third position.

19. The method recited in Claim 18, further comprising aligning a plurality of slots concentrically and circumferentially disposed about an outlet of said movable exhaust pipe with a plurality of slots concentrically and circumferentially disposed about an outlet of said second exhaust pipe.

20. The method recited in Claim 19, further comprising engaging said plurality of interference tabs of said movable exhaust pipe with said plurality of interference tabs with said first exhaust pipe to restrict the movement of said movable exhaust pipe.

21. The method recited in claim 12, wherein said decreasing said flow maldistribution further comprises moving said movable exhaust pipe in a linear direction along said second exhaust pipe from a first position to a second position.

22. The method recited in Claim 21, further comprising increasing the distance between an outlet of said movable exhaust pipe and said catalyst substrate.

23. The method recited in claim 12, wherein said decreasing said flow maldistribution further comprises moving said movable exhaust pipe in a linear direction along said second exhaust pipe from a second position to a third position.

24. The method recited in Claim 23, further comprising increasing the distance between an outlet of said movable exhaust pipe and said catalyst substrate until said outlet reaches an outlet of said second exhaust pipe.

25. The method recited in claim 24, further comprises engaging said interference tabs of said first exhaust pipe and said interference tabs of said movable exhaust pipe to restrict the movement of said movable exhaust pipe.

26. A variable flow regulator assembly comprising:

a first exhaust pipe having at least one interference tab concentrically and circumferentially disposed on an interior surface of said first exhaust pipe;

a second exhaust pipe concentrically disposed within said first exhaust pipe;

a movable exhaust pipe having at least one interference tab concentrically and circumferentially disposed on an exterior surface of said exhaust pipe;

an actuation mechanism in communication with said first exhaust pipe, said second exhaust pipe and said movable exhaust pipe; and

said movable exhaust pipe concentrically disposed about said second exhaust pipe, and between said first exhaust pipe and said movable exhaust pipe.

27. The variable flow regulator assembly recited in claim 26, further comprising said movable exhaust pipe is configured to rotate about said second exhaust pipe.

28. The variable flow regulator assembly recited in claim 27, wherein said movable exhaust pipe further comprises a plurality of slots concentrically and circumferentially disposed about an outlet, wherein said second exhaust pipe further comprises a plurality of slots concentrically and circumferentially disposed about an outlet.

29. The variable flow regulator assembly recited in claim 28, further comprising said movable exhaust pipe is configured to rotate about said second exhaust pipe from a first position to a second position, from said second position to a third position, from said second position to said first position, from said third position to said first position, and from said first position to said third position.

30. The variable flow regulator assembly recited in claim 29, wherein said plurality of slots of said second exhaust pipe and said movable exhaust pipe are configured to substantially align at said second position.

31. The variable flow regulator assembly recited in claim 29, wherein said plurality of slots of said second exhaust pipe and said movable exhaust pipe are configured to align at said third position.

32. The variable flow regulator assembly recited in claim 31, wherein said interference tabs of said first exhaust pipe and said second exhaust pipe are configured to engage and restrict the movement of said movable exhaust pipe at said third position.

33. The variable flow regulator assembly recited in claim 26, further comprising said movable exhaust pipe is configured to move in a linear direction along said second exhaust pipe.

34. The variable flow regulator assembly recited in claim 33, wherein said movable exhaust pipe is configured to move in a linear direction along said second exhaust pipe from a first position to a second position, from said second position to a third position, from said first position to said second position, from said first position to said third position, and from said third position to said first position.

35. The variable flow regulator assembly recited in claim 34, wherein said interference tabs of said first exhaust pipe and said movable exhaust pipe are configured to engage when said movable exhaust pipe moves in a linear direction from said second position to said third position.

36. The variable flow regulator assembly recited in Claim 26, wherein said actuation mechanism further comprises a mechanism selected from the group consisting of an electrical mechanism, a mechanical mechanism, an electromagnetic mechanism, and combinations comprising at least one of the foregoing.

37. The variable flow regulator assembly recited in Claim 26, wherein said actuation mechanism is disposed within said first exhaust pipe, in between said first exhaust pipe and said second exhaust pipe, and behind said movable exhaust pipe.

38. The variable flow regulator assembly recited in Claim 37, wherein said actuation mechanism is encased in a housing.

39. The variable flow regulator assembly recited in Claim 26, wherein said actuation mechanism is disposed within said first exhaust pipe, and between said first exhaust pipe and said movable exhaust pipe.

40. The variable flow regulator assembly recited in Claim 39, wherein said actuation mechanism is encased in a housing.

41. The variable flow regulator assembly recited in Claim 26, wherein said actuation mechanism is disposed on the exterior of the variable flow regulator, and configured to be sealingly secured to prevent leakage of exhaust gas.